

Impact of Nasal Condition on Self-assessed Disease Control and Treatment Satisfaction in Patients with Asthma Complicated by Allergic Rhinitis

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ABSTRACT

Background: Bodies of evidences have suggested that upper and lower airways are intricately interconnected with each other in patients with allergic airways diseases, however, few data are available concerning the impact of allergic rhinitis on self-assessed asthma condition and treatment satisfaction. The present study was conducted to clarify the association between nasal condition and self-assessment of asthma control and treatment satisfaction.

Methods: Adult patients with asthma were consecutively recruited for a systematic self-administered questionnaire to obtain information on nasal condition, self-perceived condition of asthma, and asthma treatment satisfaction.

Results: 3,140 adult patients with asthma completed the questionnaire, and of these 634 patients (mean age: 53.1, 389 female) had physician-diagnosed allergic rhinitis. There were significant correlations between nasal symptoms (sneeze, rhinorrhea, nasal obstruction) and self-perceived asthma condition (limited daily activity, wheeze, dyspnea/chest tightness, cough, sputum, sleep disturbance, overall asthma condition). Patients who considered their overall nasal condition as unfavorable or bad were more likely than those who considered their condition as good or favorable to be dissatisfied with asthma treatment ($p < 0.01$).

Conclusions: Nasal condition is closely associated with self-assessed asthma condition and asthma treatment satisfaction. Controlling allergic rhinitis is critical to attain optimal management of asthma in patients complicated by allergic rhinitis.

KEY WORDS

allergic rhinitis, asthma, questionnaire, self-assessment, treatment satisfaction

INTRODUCTION

It is well documented that patients with asthma often present with complications of allergic rhinitis and an intimate association exists between the two conditions.¹ From a pathophysiological standpoint, for example, nasal symptoms are correlated with nasal airflow, which in turn correlates with airflow limitation in the lower airways as measured by FEV₁.² Patients

with asthma complicating allergic rhinitis were reported to have more severe cough compared with those with asthma alone.³ Treatment of allergic rhinitis has been shown to reduce subsequent asthma-related emergency visits or hospitalizations.⁴ Proposed links between the two diseases include aggravation of asthma by mediators or inflammatory drips produced by diseased nasal mucosa, a putative naso-bronchial reflex, and mouth breathing resulting from

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Received 6 November 2006. Accepted for publication 23 May 2007.

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nasal obstruction.⁵ Several mechanisms have been proposed which link allergic rhinitis and asthma. These facts and proposals indicate that asthma and allergic rhinitis should be a united target for delivery of optimal management. In addition to the clinical burden, asthma and allergic rhinitis have a considerable impact on quality of life. Poorly controlled disease can result in not only physical but also emotional strain in affected individuals.⁶ These disease control problems perceived by patients are associated with dissatisfaction to treatment,⁷ which in turn may result in suboptimal outcome. However, data concerning the associations of the self-assessed conditions of the two diseases are surprisingly scarce. In the present study we had an opportunity to gain insight into the influence of nasal condition on self-assessment of disease control and treatment satisfaction in patients with asthma complicated by allergic rhinitis.

METHODS

STUDY DESIGN

Data were obtained from 217 medical institutions participating in a survey on bronchial asthma and allergic rhinitis in eight prefectures of the Kyushu district in Japan between May and December of 2003. Subjects enrolled in the study were non-smoking consecutive adult patients with asthma complicated by allergic rhinitis or with asthma alone who regularly visited one of the medical institutions participating to the study. The study protocol was conducted in accordance with the Declaration of Helsinki and approved by the institutional ethical committees, and all participants gave written informed consent. In the survey a set of self-administered questionnaires was completed twice one month apart by each participant to obtain information on symptoms, self-assessed disease control and treatment satisfaction.

DIAGNOSIS OF ASTHMA AND ALLERGIC RHINITIS

The diagnosis of asthma was established by reversible airflow obstruction that occurs naturally or after treatment, and/or airway hyperresponsiveness.⁸ Severity of asthma was judged based on current medications, symptoms and lung function.⁸ Patients were considered as having allergic rhinitis if they presented with sneezing or nasal itching, watery nasal discharge, and nasal obstruction, and either eosinophilia in nasal discharge or positive results for the skin prick test or elevated serum specific IgE for common antigens (house dust and pollens).

QUESTIONNAIRE

The questionnaire items were as follows: items related to asthma (limitation in activity, wheeze, dyspnea/chest tightness, cough, sputum, sleep disturbance, overall self-assessed disease control, and current treatment satisfaction); and items related to na-

sal symptoms (sneeze, rhinorrhea, nasal obstruction, and overall self-assessment of disease condition). Each nasal symptom was graded as follows: for sneezing and rhinorrhea as measured by frequency of nose blowing, none, 1 to 5 (mild), more than 6 times (moderate to severe) per day; for nasal obstruction, none, obstruction without air passage blockade (mild), obstruction with occasional nasal air passage blockade or more severe (moderate to severe).⁹ Symptoms of asthma (limited activity, wheeze, dyspnea/chest tightness, cough, sputum) were graded based on average occurrence of the symptoms in a week: none, 1 or 2, 3 or more days of the week. Self-assessed overall disease condition was rated as excellent, good/fair, or unfavorable/bad. Asthma treatment satisfaction was reported as satisfied, mostly satisfied, neutral/dissatisfied.

STATISTICAL ANALYSIS

All data analysis was performed by using SPSS 13.0J for Windows software (SPSS Inc., Chicago, Illinois, USA). Correlation between the parameters was analyzed using Spearman's rank correlation. Comparisons of the proportion between groups were performed by using the Kruskal-Wallis non-parametric test. *P* values less than 0.05 were considered significant.

RESULTS

PATIENT CHARACTERISTICS

The questionnaire was distributed to 3,270 patients with asthma, and 3,140 (96.0%) including 1,289 men (mean age: 65.3 year) completed the questionnaire. 634 of the total participants including 245 men (mean age: 53.1 year) had physician-diagnosed allergic rhinitis.

Demographics and current treatment for these patients are summarized in Table 1. There were 230 mild, 346 moderate, and 58 cases of severe asthmatics. Mean age of patients with severe asthma (58.4 year) was higher than mild (50.4 year) and moderate (53.9 year) counterparts. Inhaled corticosteroids (ICS) were prescribed in 66% of patients with mild asthma, and in most of the patients with moderate and severe asthma. Mean dose of ICS was the highest in patients with severe asthma. Oral steroid was used in 88% of patients with severe asthma, whereas few patients with mild and moderate disease used oral steroids. Theophylline, β -agonists (inhaled long acting β -agonist or transdermally releasing formula) and leukotriene receptor antagonists were more frequently used in patients with moderate and severe asthma than in those with mild disease. Nasal corticosteroids were prescribed in 24% of patients with severe asthma and 11% of those with mild and moderate asthma.

The proportions of the severity of nasal symptoms in individuals based on the severity of asthma are

summarized in Table 2. No significant differences in the proportion of the severity of nasal symptoms were noted among patients with differing severity of asthma.

CORRELATION BETWEEN NASAL AND ASTHMA SYMPTOMS

Correlation between symptoms of allergic rhinitis and those of asthma based on self-assessment are presented in Table 3. Although the sizes of the associations based on the correlation coefficient were generally small,¹⁰ the severity of sneezing was significantly correlated with all domains of severity of asthma symptoms, *i.e.* activity limitation, wheeze, dyspnea/chest tightness, cough, sputum, sleep disturbance, and overall asthma control. The severity of rhinorrhea was correlated with all but wheezing in the morning and nighttime dyspnea. The severity of nasal obstruction was significantly correlated with all

symptoms except dyspnea/chest tightness in the morning and daytime.

IMPACT OF NASAL CONDITION ON ASTHMA TREATMENT SATISFACTION

When patients were divided in three groups based on their satisfaction to current asthma treatment, there was a significant difference in the proportion of self-assessed overall nasal condition ($p < 0.01$) (Fig. 1). 433 patients were satisfied with their current asthma treatment. The proportions of the overall nasal condition of those patients was as follows: 67 (15.5%) excellent; 262 (60.5%) good to fair; 104 (24.0%) unfavorable to bad. 106 patients were almost satisfied with treatment, composed of 7 (6.6%) who had excellent nasal condition, 64 (60.4%) with good to fair, and 35 (33.0%) with unfavorable to bad. The figures for 95 patients who were neutral to dissatisfied with asthma treatment were 3 (3.2%), 47 (49.5%), and 45 (47.4%), respectively.

DISCUSSION

The results of the present study demonstrated that the severity of nasal symptoms (sneeze, rhinorrhea, nasal obstruction) were significantly associated with individual asthma symptoms, such as limited daily activity, wheeze, dyspnea/chest tightness, cough, sputum, sleep disturbance, and overall self-perceived control of asthma. Furthermore, the results indicated that overall nasal condition had a significant impact on the patients' asthma treatment satisfaction. The association between nasal symptoms and asthma symptoms scores has been demonstrated.³ The results of the present study were in line with those, and highlighted the association of individual nasal symptoms with most of the individual asthma symptoms and overall self-assessed asthma condition, although the size of the associations based on the correlation coef-

Table 1 Patient Characteristics

Asthma Severity	Mild	Moderate	Severe
Number	230	346	58
Female (%)	144 (62.6)	217 (62.7)	28 (48.3)
Age [year]	50.4	53.9	58.4
ICS [†] (%)	151 (65.6)	342 (98.8)	57 (98.3)
ICS [†] dose [μ g]	204.6	424.1	791.4
Oral corticosteroid (%)	2 (0.7)	5 (1.6)	49 (87.5)
β 2 agonist [‡] (%)	20 (8.7)	171 (49.4)	26 (44.8)
Theophylline (%)	46 (20)	230 (66.5)	44 (75.9)
Leukotriene modifier (%)	33 (14.3)	191 (55.2)	30 (51.7)
Anti-histamines (%)	49 (21.3)	64 (18.5)	9 (15.5)
Nasal corticosteroid (%)	26 (11.3)	37 (10.7)	14 (24.1)

[†] ICS denotes inhaled corticosteroid

[‡] includes long-acting beta agonist and dermal patch

Table 2 Frequency of Nasal Symptoms in Subjects

		Asthma Severity		
		mild	moderate	severe
Sneeze (%)	none	25.7	27.9	26.9
	mild	60.3	61.8	63.5
	moderate/severe	14.0	10.3	9.6
Rhinorrhea (%)	none	17.1	16.3	17.6
	mild	52.3	51.1	58.8
	moderate/severe	30.6	32.6	23.5
Nasal obstruction (%)	none	37.7	35.4	32.0
	mild	33.0	36.4	44.0
	moderate/severe	29.3	28.2	24.0
Overall nasal condition (%)	excellent	13.9	11.6	8.6
	good/fair	56.1	60.4	60.3
	neutral/unfavorable	30.0	28.0	31.0

Table 3 Correlations between Nasal and Asthma Symptoms[†]

		Nasal Symptoms		
		Sneeze	Rhinorrhea	Nasal Obstruction
Activity limitation		0.15 *	0.09 **	0.14 *
Morning	wheeze	0.16 *	0.12 *	0.15 *
	dyspnea	0.14 *	0.11 **	NS
Daytime	wheeze	0.11 *	NS	0.15 *
	dyspnea	0.13 *	0.10 **	NS
Nighttime	wheeze	0.20 *	0.11 *	0.15 *
	dyspnea	0.17 *	NS	0.09 **
Cough		0.19 *	0.14 *	0.13 *
Sputum		0.11 *	0.11 *	0.14 *
Sleep disturbance		0.14 *	0.11 *	0.14 *
Overall asthma condition		0.15 *	0.14 *	0.15 *

[†] Correlations were analyzed by way of Spearman's rank correlation.

* $p < 0.01$, ** $p < 0.05$

NS denotes not significant.

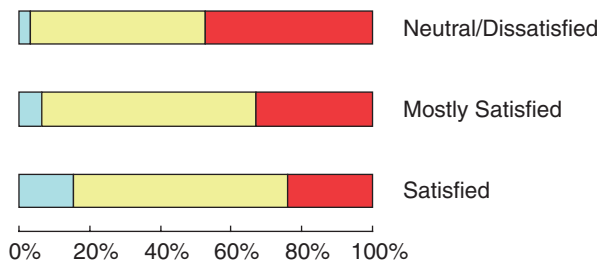


Fig. 1 Proportion of self-assessed overall nasal conditions (aqua, excellent; yellow, good/fair; red, unfavorable/bad) in subgroups based on satisfaction to treatment of asthma (upper, neutral to dissatisfied; middle, mostly satisfied; lower, satisfied). There was a statistically significant difference in the proportion. ($p < 0.001$)

ficient were generally small¹⁰ in this data set.

Patient satisfaction is multifaceted, and involves various aspects of medical management and patient-doctor interactions.¹¹ It has been documented that problems in disease control is one of the contributors to dissatisfaction with treatment in patients with asthma.⁷ Since individual asthma symptoms and self-perceived overall asthma conditions were significantly associated with nasal symptoms, it is likely that patients who were dissatisfied with asthma treatment had a poorer nasal condition and vice versa. It is known that treatment satisfaction is critical to maintain adherence to treatment.¹² Therefore, it can be speculated that controlling nasal symptoms is important in attaining adherence to treatment.

The limitation of the present study is that unmeasured factors might have influenced the observation. For example, the recognition of the medications by the patients was not evaluated in the study. Some

agents such as leukotriene receptor antagonists and anti-histamines could be prescribed to treat either asthma or allergic rhinitis, or both conditions. Patient recognition of the target of their medications may affect their assessment of nasal conditions. Likewise, some of the symptoms, such as sleep disturbance, can be caused by both conditions,¹³ so that it is difficult to weigh the contribution of asthma to the symptoms. Second, because of the nature of a cross-sectional study selection of the subjects could have potentially been biased, and the results presented here reflect temporal but not long-term associations. Third, the prevalence of nasal allergy in the prevalence is lower than those of other reports,^{14,15} suggesting that diagnosing allergic rhinitis was missed in a part of the patients, especially in those who have mild nasal symptoms. This might have influenced the study results.

Despite these limitations, the number of analyzed subjects from multiple institutions still signifies the findings of the study. Randomized prospective studies are preferred to validate the present findings further.

Despite these methodological limitations, the results of the present study are noteworthy because an intimate association of allergic rhinitis and asthma in the light of the patients' perceptions has been demonstrated. Since nasal condition has a significant impact on self-perception of asthma control and treatment satisfaction, it should be monitored as closely as asthma conditions to deliver optimal care for patients with asthma complicated by allergic rhinitis.

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